

Australian beach flies (Diptera: Canacidae)

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Abstract.—The Australian fauna of beach flies (8 genera and 14 species), excluding Zaleinae, is reviewed, including description of seven new species as follows (type locality indicated in parentheses): *Nocticanace australina* (NSW: Lord Howe Island, Roach Island Beach), *Procanace mcalpinei* (NSW: Karuah), *Chaetocanace flavipes* (WA: West Kimberley, 4 km SSW of Cape Bertholet), *Chaetocanace koongarra* (WA: Koongarra, 15 km E of Mt. Cahill), *Chaetocanace longicauda* (NT: 35 km W Jabiru, South Alligator River area), *Dynomiella australica* (TAS: Squeaking Point near Port Sorell), and *Xanthocanace collessi* (WA: West Kimberley, 5 km SSW of Cape Bertholet). *Procanace* Hendel and *Dynomiella* Giordani Soika are reported for the first time from Australia. An undescribed genus and species, represented by a single female, is also reported.

The Australian fauna of the family Canacidae, more commonly known as beach or surf flies, has never been treated comprehensively. Only the subfamily Zaleinae, which is questionably a canacid, has been considered recently (McAlpine 1982, 1985). Although relatively few species occurring in Australia have been described, nine species in six genera (Mathis 1989a, Colless & McAlpine 1991), additional taxa have been discovered recently, and description of these, within the context of a faunal review, is the primary purpose of this paper.

Three of the nine described species are in the genus *Zalea* McAlpine. This enigmatic genus has been segregated as the subfamily Zaleinae (McAlpine 1982, 1985) but is perhaps better placed in the family Tethinidae (Mathis 1992, Freidberg 1995). *Zalea*, which was recently revised (McAlpine 1982, 1985), is not included here.

The new species described herein mostly represent recent discoveries but also clarify the status of an unidentified species of *Nocticanace* Malloch that was reported previously from Australia (Colless & McAlpine 1991). Two of the new species are repre-

sentatives of *Procanace* Hendel and *Dynomiella* Giordani Soika, both genera previously unknown from Australia. The Australian species of *Dynomiella* is of particular interest, being the first record of this genus outside of Africa and representing a significant range extension. Four of the other six new species belong in genera previously known from Australia (*Chaetocanace* Hendel and *Xanthocanace* Hendel), and the remaining species, perhaps representing a new genus, is included in keys and discussions but is not described, being known from a single female.

The more inclusive purpose of this paper is to document comprehensively the Australian fauna (excluding the subfamily Zaleinae), including keys to genera and species known from the region. Illustrations, particularly of characters of the external male terminalia to aid in species identification, and locality data to understand better the distribution of the included taxa are also provided. This effort is intended to foster further interest in the natural history and phylogeny of the family, which is almost exclu-

sively associated with maritime beaches in temperate and tropical regions of the world.

Methods and Materials

For each genus and species reviewed, a synonymy, the known distribution, including detailed information on the type locality, the depository of the primary types, specific locality data for Australia, the generalized distribution, a diagnosis, and a remarks section, as appropriate, are provided. In the synonymies, only literature that is pertinent to the Australasian Region or a taxon's nomenclatural history is cited. For new species, a more complete description is provided, in addition to characters included in diagnoses of appropriate species groups and genera. The species groups that are recognized for the genera *Nocticanace* and *Procanace* are not necessarily monophyletic assemblages and are used primarily to divide conveniently the genera into manageable units and to facilitate their identification. Their characterization and the species composition may change as a result of future revisionary and phylogenetic studies. The descriptive format for the new species follows Mathis & Wirth (1979) and Mathis (1982, 1988). More details concerning the morphology and higher classification of Canacidae are found in Mathis (1982) and Wirth (1987).

Two venational ratios are used in the descriptions. Costal vein ratio: The straight line distance between the apices of vein R_{2+3} and R_{4+5} /distance between the apices of veins R_1 and R_{2+3} . M vein ratio: The straight line distance along vein M between crossveins (dm-cu and r-m)/distance apicad of dm-cu.

Specimens, holotypes in particular, are housed in the following institutions (acronyms are used in the descriptive portion of this paper).

- AM Australian Museum, Sydney (Dr. David K. McAlpine).
- ANIC The Australian National Insect Collection, CSIRO, Division of

Entomology, Canberra (Dr. Peter S. Cranston).

- BMNH The Natural History Museum (formerly the British Museum (Natural History)), London, England (Dr. Brian Pitkin).
- UQIC University of Queensland Insect Collection, Brisbane (Ms Margaret A. Schneider).
- USNM former United States National Museum, collections in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.
- ZIL Zoological Institute, University of Lund, Sweden (Dr. Roy Danielsson).

Family Canacidae Jones

Key to Australian Genera of Canacidae

1. Laterocline fronto-orbital setae 3; katapisternal seta usually present (lacking in the *grisescens* group of *Procanace*); lamella of ♀ terminalia bearing 2 moderately large setae, one apical the other subapical, each rather bluntly rounded (subfamily Nocticanacinae) 2
 - Laterocline fronto-orbital setae either 4 or more, or 3 and with katapisternal seta lacking (subfamily Canacinae) 3
2. Intrafrontal setae absent, although anterior 1/3 of frons occasionally with scattered setulae ... *Procanace* Hendel
 - One or 2 intrafrontal setae in addition to any other setulae *Nocticanace* Malloch
3. Lamella of ♀ reduced and lacking any large setae new genus
 - Lamella of ♀ terminalia large with 1 large, apical seta, this usually acutely pointed 4
4. Anterior notopleural seta present; lateral scutellar setae usually 2 pairs 5

- Anterior notopleural seta absent; lateral scutellar setae 1 pair 7
- 5. Vein M with last section arcuate; mesofrons uniformly and densely setulose; 4-6 fronto-orbital setae; setae generally pale
 *Xanthocanace* Hendel
- Vein M with last section more or less straight, not distinctly arcuate; mesofrons with bare areas, not densely setulose; 4 fronto-orbital setae; setae generally dark colored 6
- 6. Arista bearing 2 rows of hairs, these extended from base to apex, 1 row dorsal, the other ventral; postocellar setae conspicuously smaller than ocellar setae and with proclinate and slightly divergent orientation (the *albiceps* group). *Isocanace* Mathis
- Arista with at least apical 1/3 bare; postocellar setae subequal in size and with similar orientation as ocellar setae . . . *Dynomiella* Giordani Soika
- 7. Mesofrons well sclerotized, distinct from membranous-appearing parafrons; anteroclinate genal seta, large, black; upturned genal setae lacking; arista with 2 rows of setulae extended to apex; postpronotum setulose *Chaetocanace* Hendel
- Mesofrons and parafrons not distinct from each other except by color in some species, both appearing membranous although usually microtomentose; anteroclinate genal seta small, pale; upturned genal setae 2; arista with apical 1/3 to 1/2 bare, style-like; postpronotum bare of setulae *Trichocanace* Wirth

Subfamily Nocticanacinae Mathis
 Genus *Nocticanace* Malloch

Nocticanace Malloch, 1933:4. Type species: *N. peculiaris* Malloch, by original designation.—Mathis, 1989b:594 [key to species groups]; 1992:8-10 [world catalog].

Diagnosis.—Small to medium-sized beach flies, length 1.8 to 3.7 mm; general coloration brown to grayish black.

Head: Intrafrontal setae 1 pair; postocellar setae either absent or much reduced, less than 1/4 length of ocellar setae; ocelli forming an isosceles triangle, distance between posterior ocelli greater than that between either posterior ocellus and the anterior ocellus. Lower facial margin sinuous; clypeus low, width subequal to length of antenna. Two large upturned genal setae; anteroclinate genal seta moderately well developed, at least 1/2 length of larger upturned genal setae. Palpus grayish black, bearing 1 to several long setae, each seta 2 to 3 times as long as greatest width of palpus.

Thorax: Anepisternum with scattered setulae; proepisternal seta absent; katepisternal seta present, well developed. Legs entirely grayish black; forefemur bearing 4-6 long, evenly spaced setae along posteroventral margin, length of setae at least equal to and usually greater than width of femur.

Discussion.—*Nocticanace*, now with 35 species (Mathis 1991), has more species than any other genus of the family. These have been divided into five species groups (Mathis 1989b, Mathis & Freidberg 1991), mostly to facilitate their identification. The new Australian species described below is part of the *pacifica* group, the largest group in the genus with 22 species. This genus probably occurs on mainland Australia in addition to Lord Howe Island.

The *pacifica* Group

Diagnosis.—General coloration dark, grayish brown to grayish black. Thorax: Acrostichal setulae absent; apical scutellar setae distinctly upturned; anterior notopleural seta absent; proepisternal seta(e) present; anepisternum with scattered setulae; katepisternal seta present. Legs entirely dark, grayish brown to black; forefemur with 4-6 long and evenly spaced setae along posteroventral margin, length greater



Figs. 1–2. External male terminalia of *Nocticanace australina*: 1, epiandrium, cercus, and surstylus, lateral view; 2, surstylus, ventrolateral view. Scale = 0.1 mm.

than width of femur; midfemur of male without comblike row of setae; hindtibia lacking spinelike setae apically. Wing with length of apical section of vein CuA_1 long, about twice length of crossvein dm-cu; M vein ratio 0.45–0.5.

Nocticanace australina, new species

Figs. 1–2

Nocticanace species, Colless & McAlpine, 1991:779.

Diagnosis.—This species is distinguished from congeners, especially of the *pacifica* group, by its dark coloration (grayish brown to charcoal) and by the napiform shape of the surstylus in lateral view.

Description.—Small to moderately small beach flies, length 1.9 to 2.4 mm; generally dark colored, densely microtomentose, appearing dull, grayish brown to charcoal black.

Head: Frons grayish black. Antenna black. Face whitish gray to grayish black

depending on angle of view; gena similar in color to face.

Thorax: Mesonotum brown to brownish black; pleural areas gray to charcoal gray. Wing lightly infuscate, faintly brownish black; costal vein ratio 0.17; M vein ratio 0.5. Legs uniformly and entirely grayish black.

Abdomen: External male terminalia: surstylus in lateral view (Figs. 1–2) napiform, anterior and posterior margin shallowly rounded, ventral margin produced to form a narrow ventromedial process that is curved anteroventrally; posterior margin of surstylus bearing fringe of long setulae, these oriented medially.

Type material.—The holotype male is labeled “[Australia. New South Wales:] Roach Isl. Beach[,] Lord Howe Isl[and].[,] 23 Feb 1988[,] H. J. de S. Disney[,] Rock pools/Austr. Mus. Collection.” Paratypes are as follows: Australia. New South Wales: Lord Howe Island. Old Gulch, Dec 1972, Z. Liepa (1 ♂; ANIC); Roach Island Beach (rock pools), 23 Feb 1988, H. J. de S. Disney (7 ♂; AM, USNM); Salmon Beach, Dec 1972, Z. Liepa (1 ♀; ANIC). The holotype is double mounted (glued to a paper point), is in excellent condition, and is deposited in the ANIC.

Distribution.—Australasian: Eastern Australia (NSW).

Etymology.—The specific epithet, *australina*, refers to the continent where this species occurs.

Remarks.—Colless & McAlpine (1991) first listed this species, although then undescribed, from Australia.

Genus *Procanace* Hendel

Procanace Hendel, 1913:93. Type species: *Procanace grisescens* Hendel, by original designation.—Wirth, 1951:253–259 [revision].—Delfinado, 1970:527–531 [revision of species from New Guinea].—Delfinado & Wirth, 1977:392 [Oriental catalog].—Hardy & Delfinado, 1980:388–406 [revision of Hawaiian spe-

cies].—Mathis, 1989a:669–670 [Australasian/Oceanian catalog]; 1989b:603–607 [key to species groups]; 1992:10–12 [world catalog].

Diagnosis.—General coloration whitish gray, olivaceous, to blackish brown.

Head: Intrafrontal setae absent, but with a few setulae inserted anteriorly; fronto-orbital setae 3; ocelli forming equilateral or isosceles triangle, if isosceles, the greater distance is between posterior ocelli. Arista pubescent over entire length. Two large upturned genal setae; anterocline genal seta moderately well developed. Palpus not bearing long setae. Epistomal margin, in lateral view, more or less horizontal.

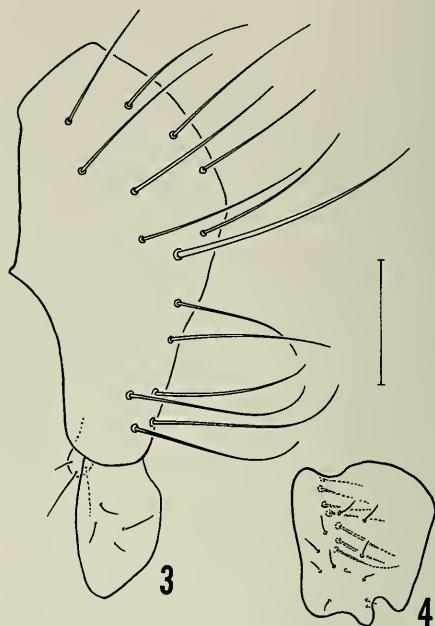
Thorax: Acrostichal setae, especially a prescutellar pair of large setae, usually lacking (setulae present in species of the *williamsi* group); scutellar disc lacking setae (1–2 pairs of scutellar disc setulae occur in *P. nakazatoi* Miyagi of the *williamsi* group); 2 pairs of marginal scutellar setae, apical pair not upturned; anterior and posterior notopleural setae present, length of both subequal; anepisternum with scattered setulae. Katepisternal seta usually present (lacking in species of the *griseus* group). Hindtibia lacking spinelike setae apically.

Abdomen: Male genitalia as follows: epandrium in posterior view wider than high; cerci reduced, poorly sclerotized; surstylus with an anterior and a posterior lobe, the latter larger, sometimes markedly so and shape unique to species.

Discussion.—*Procanace*, now with 30 species, is the second largest genus in the family. Mathis (1989b) divided the genus into five species groups, largely to expedite identification of the various species. Some of the groups are monophyletic, but others may not be. The new Australian species is in the *fulva* group, which is diagnosed below.

The *fulva* Group

Diagnosis.—General coloration whitish olivaceous to brown. Head: Postocellar se-



Figs. 3–4. External male terminalia of *Procanace mcalpinei*: 3, epandrium, lateral view; 4, surstylus, posteroventral view. Scale = 0.1 mm.

tae either absent or much reduced; ocelli forming equilateral triangle. Palpus yellow. Clypeus low, height $\frac{1}{3}$ to $\frac{1}{4}$ eye height. Thorax: Acrostichal setulae absent; proepisternal seta(e) usually present; anepisternum with scattered setulae; katepisternal seta present. Femora and tibiae grayish, tarsi yellowish; forefemur lacking 4–6 long and evenly spaced setae along posteroventral margin, length greater than width of femur; midfemur of male bearing comblike sparse row of setae. Wing with length of apical section of vein CuA_1 short, subequal to or slightly longer than crossvein $dm-cu$; M vein ratio 0.75 to 0.8.

Remarks.—The *fulva* group, now with nine species, occurs along the western margin of the Pacific Ocean (eastern Palearctic, Oriental, and Australasian regions).

Procanace mcalpinei, new species

Figs. 3–4

Diagnosis.—This species is distinguished from congeners by the shape of the

surstylus, which in lateral view is irregularly ovate. The posterior margin of the surstylus bears a median tooth and short emargination just dorsad of tooth.

Description.—Moderately small beach flies, length 2.0 mm; generally grayish brown to brown, generally dull, microtomentose.

Head: Mesofrons brown, similar to mesonotum; parafrons more blackish brown; postocellar setae reduced, about $\frac{1}{2}$ length of ocellar setae, proclinate slightly divergent. Scape and pedicel grayish black; 1st flagellomere brownish yellow with faint blackish tinges. Face grayish white; gena low, about $\frac{1}{3}$ eye height, concolorous with face anteriorly, yellowish along anteroventral margin of eye, becoming slightly grayer posteriorly.

Thorax: Mesonotum light brown to faintly olive brown, dull; pleural areas grayer. Wing lightly infumate, faintly brownish; costal vein ratio 0.18; M vein ratio 0.8. Legs brownish yellow; femora thinly invested with whitish microtomentum.

Abdomen: Dorsum concolorous with mesonotum. External male terminalia as follows: epandrium bearing numerous long setae; surstylus in lateral view (Fig. 3–4) irregularly ovate, median surface bearing dorsoventral row of stout setulae, posterior margin (Fig. 4) with short emargination at dorsal $\frac{1}{4}$ and an edentate projection medially.

Type material.—The holotype male is labeled “[AUSTRALIA.] Karuah, N.S.W. 23.xii.1968 [23 dec 1968] inlet: beach I. C. Yeo.” The holotype is double mounted, is in good condition (right antenna missing, abdomen removed and dissected, structures in an attached microvial), and is deposited in UQIC.

Distribution.—This species is known only from the type locality.

Etymology.—The specific epithet, *mc Alpinei*, is a genitive patronym to recognize and honor the contributions of David K. McAlpine to the study of acalyptate Diptera, the Australian fauna in particular.

Subfamily Canacinae Jones
Tribe Dynomiellini Mathis
Genus *Chaetocanace* Hendel

Chaetocanace Hendel, 1914:98. Type species: *Canace biseta* Hendel, by original designation and monotypy.—Malloch, 1924:333 [generic key].—Curran, 1934:357 [generic key].—Wirth, 1951:265 [review].—Mathis, 1982:7–9 [review]; 1992:5 [world catalog].

Diagnosis.—Resembling *Isocanace* but differing from it and other genera by the following combination of characters.

Head: Mesofrons distinct from parafrons, shinier, less microtomentose, with 4–6 large, lateral, generally proclinate setae, middle area bare; postocellar setae subequal to ocellar setae and with same orientation; 4 pairs of large, laterocline fronto-orbital setae; arista plumose, length of branching rays nearly equal to twice basal arisal width; upturned genal setae lacking, antero-clinate genal seta 1, inserted near level of anterior margin of eye.

Thorax: Dorsocentral setae 4 (1 + 3), all subequal in size; acrostichal setae small (if at all evident), in 2 rows, lacking large pair of prescutellar setae; 1 pair of scutellar setae; anterior supra-alar seta lacking or much reduced in length; anterior notopleural seta lacking; anepisternal setae pale; katepisternal seta lacking; hindtibia with conspicuous, rather stout, apical seta anteroventrally; apical section of vein M straight.

Abdomen: Female genital lamellae very broad basally, basilateral margins rounded, narrowed abruptly near level of cleft, lamellae very narrow from level of cleft to apices, with only 1 large stout, acute, terminal seta at each apex. External male terminalia: surstylus a single ventral projection from ventral margin of epandrium, shape like an inverted T or more or less triangular, ventrally produced to an anterior and posterior angle.

Remarks.—There are now four Australian species of *Chaetocanace*, including three that are newly described. This more

than doubles the known species in this genus and establishes Australia as the center for diversity for *Chaetocanace*. Only *C. biseta* apparently does not occur in Australia.

Key to Australian Species of
Chaetocanace

1. Mesonotum and frons mostly brown to blackish brown, subshiny; surstylus shaped like an inverted T (Fig. 7), basal portion a gradually narrowed extension from the ventral margin of the epandrium, apical $\frac{1}{3}$ projected anteriorly and posteriorly *C. koongarra*, new species
- Mesonotum and frons brown to gray, dull; surstylus shaped otherwise 2
2. Femora mostly yellow; mesonotum mostly gray or tannish gray; surstylus only gradually becoming wider ventrally, ventral margin shallowly emarginate (Fig. 6) *C. flavipes*, new species
- At least fore- and hind femora mostly gray; mesonotum mostly grayish brown to brown; surstylus becoming markedly wider ventrally, more or less triangular 3
3. Anteroventral process of surstylus shaped like a long foot (Fig. 8); posteroventral process distinctly pointed *C. longicauda*, new species
- Anteroventral process of surstylus not footlike 4
4. Surstylus with posterodorsal angle acutely pointed *C. biseta* (Hendel)
- Surstylus with posterodorsal angle bluntly rounded .. *C. brincki* Delfinado

Chaetocanace brincki Delfinado
Fig. 5

Chaetocanace brincki Delfinado, 1975:221 [HT ♂ (ZIL); Sri Lanka. Northern Province: Mannar (16 km E), Nay Aru at Pal-

lamadu; figs. of ♂ & ♀ terminalia].—Delfinado & Wirth, 1977:391 [Oriental catalog].—Mathis, 1982:9 [catalog, key]; 1989a:670 [Australasian/Oceanian catalog]; 1992:5 [world catalog].

Australian specimens examined.—New South Wales: North Cronulla, 12 Mar 1962, D. K. McAlpine (1 ♂; AM). Queensland: Cairns (bay shore, puddles), 19–25 Apr 1957, W. W. Wirth (25 ♂, 26 ♀; AM, ANIC, USNM). Eurimbula (mangroves), 28 Mar 1975, D. K. McAlpine (1 ♂; AM). Western Australia: Batten Point (30 km NE by E of Borrooloola), 18 Apr–30 Oct 1975, 1976, D. H. Colless, M. S. Upton (4 ♀; ANIC).

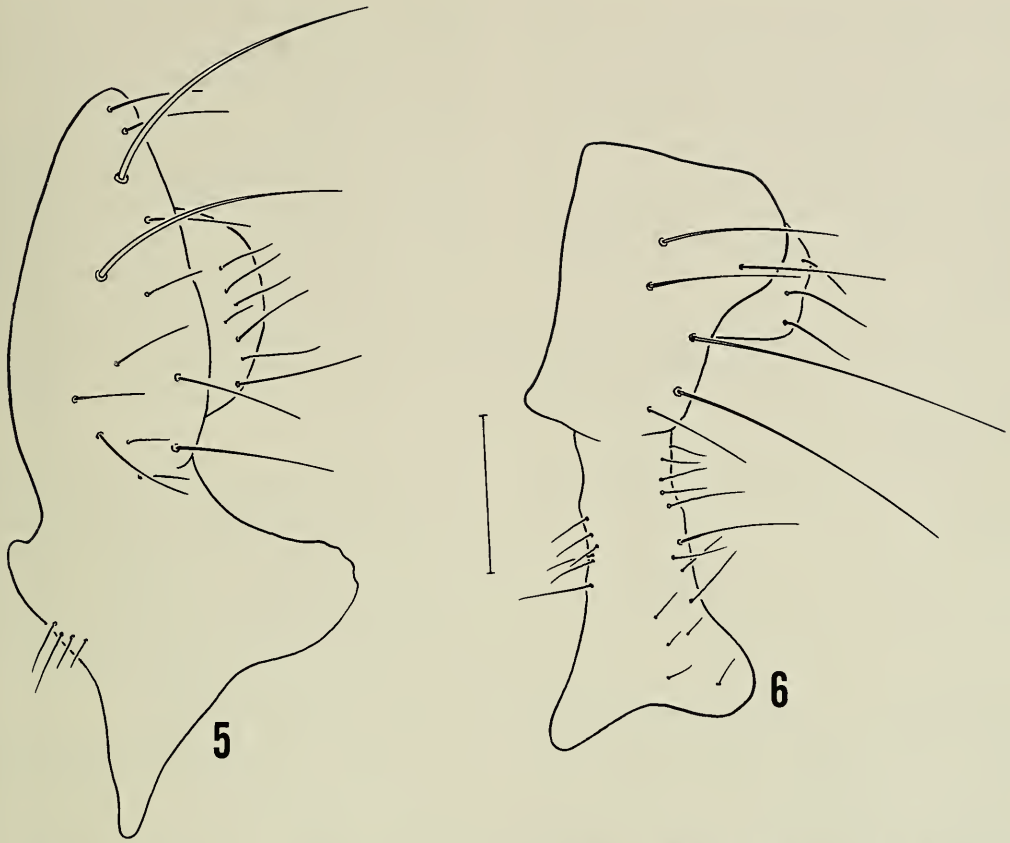
Distribution.—Australasian/Oceanian: Australia (NSW, QLD, WA). Oriental: Philippines (Luzon). Sri Lanka. Palearctic: Japan (Hokkaido, Honshu, Kyushu, Shikoku), Korea (Seoul).

Diagnosis.—Externally this species is very similar to *C. biseta* (Hendel), and many Australian specimens have been misidentified as the latter or as the new species described below. I can distinguish between *C. biseta* and this species only on the basis of characters of the male terminalia, especially the shape of the surstylus (Fig. 5), which is more or less triangular in lateral view, with the posterodorsal corner broadly produced and bluntly rounded. This species differs from *C. koongarra* in having the mesonotum lighter in color, mostly dull, brown to grayish brown, and only the apical tarsomere is brown.

Remarks.—This species was reported previously from Australia (Mathis 1992), but only from Queensland. It is now found to be more widespread, occurring southward to New South Wales and westward to Western Australia.

Chaetocanace flavipes, new species
Fig. 6

Diagnosis.—This species is distinguished from *C. brincki* primarily by the shape of the external male terminalia, spe-



Figs. 5–6. External male terminalia of *Chaetocanace* species: 5, epandrium, cercus, and surstylus of *C. brincki*, lateral view. 6, epandrium, cercus, and surstylus of *C. flavipes*, lateral view. Scale = 0.1 mm.

cifically the surstylus which in lateral view becomes very gradually wider ventrally to form short anterior and posterior processes.

Description.—Small to moderately small beach flies, body length 1.8 to 2.3 mm.

Head: Frons blackish brown and subshiny on anterior $\frac{2}{3}$, portion posterior to anterior ocellus dark brown and less shiny. Antenna blackish brown; arista brown. Face and gena densely microtomentose, whitish to faintly bluish white.

Thorax: Mesonotum gray, especially laterally and anteriorly, to mostly grayish brown to brown with faint olivaceous coloration, dull; pleural areas generally whitish gray; anepisternum faintly bluish; katepisternum whitish gray. Acrostichal setae greatly reduced or lacking, not evident. Wing hyaline; costal vein ratio 0.28; M vein

ratio 0.5. Legs yellow; femora lightly and sparsely invested with whitish microtomentum; apical tarsomere brown.

Abdomen: External male terminalia as follows: surstylus in lateral view (Fig. 6) gradually becoming wider ventrally, anteroventral and posteroventral angles produced into short processes, posterior process wider and more bluntly produced; ventral margin shallowly emarginate.

Type material.—The holotype male is labeled “PAPUA NEW GUINEA[,] Central Prov[ince]. Lea Lea[,] 6 Oct 1985, J. W. Ismay (saltpan margin).” Forty paratypes (16♂, 24♀; USNM) bear the same locality data as the holotype (dates vary from 23 Feb to 6 Oct 1985, 1986). Other paratypes are as follows: Australia. Western Australia: West Kimberley, Cape Bertholet (4 km

SSW; at light), 18 Apr 1977, D. H. Colless (1 ♂; ANIC). West Kimberley, Cape Bertholet (8 km S), 18–19 Apr 1977, D. H. Colless (1 ♂, 1 ♀; ANIC). Drysdale River (15.02°S, 126.55°E), 3–8 Aug 1975, I. R. B. Common, M. S. Upton (1 ♂, 2 ♀; ANIC). The holotype is in excellent condition, is double mounted (minute nadel in block of plastic), and is deposited in the USNM.

Distribution.—This species is known thus far from the type locality in Papua New Guinea (Central Province) and Western Australia.

Etymology.—The specific epithet, *flavipes*, refers to the yellow legs, especially the femora.

Chaetocanace koongarra, new species

Fig. 7

Diagnosis.—This species is distinguished from *C. brincki* primarily by the shape of the external male terminalia, specifically the surstylus which is narrowly produced on the basal $\frac{2}{3}$, gradually tapered toward venter, thereafter on apical $\frac{1}{3}$ rather abruptly produced anteriorly and posteriorly to form distinct processes, posterior process shorter and invested with long microtomentum.

Description.—Moderately small beach flies, body length 2.4 mm.

Head: Frons blackish brown and subshiny on anterior $\frac{2}{3}$, portion posterior to anterior ocellus dark brown and less shiny. Antenna blackish brown; arista brown. Face and gena densely microtomentose, whitish to faintly bluish white.

Thorax: Mesonotum blackish brown to brown, subshiny, darker and shinier through dorsocentral tract of setae, similar to frons; anterior supra-alar seta present although greatly reduced, less than $\frac{1}{2}$ length of posterior seta; pleural areas generally whitish gray; anepisternum faintly bluish; katapisternum whitish gray. Acrostichal setae greatly reduced or lacking, not evident. Wing hyaline; costal vein ratio 0.22; M vein

ratio 0.63. Legs mostly yellow; femora lightly and sparsely invested with whitish to whitish gray microtomentum; apical 1–2 tarsomeres brown.

Abdomen: External male terminalia as follows: surstylus in lateral view (Fig. 7) narrowly produced basally, gradually tapered toward venter, thereafter rather abruptly produced anteriorly and posteriorly to rounded processes; posterior ventral process shorter and anterior process, bearing few setulae but invested with hairlike microtomentum; anterior ventral process bare.

Type material.—The holotype male is labeled “[AUSTRALIA.] Koongarra, 15km E of Mt. Cahill, N[orthern].T[erritory]. 6–9 March 1973[,] D. H. Colless/At light.” The holotype is in good condition, is double mounted (minute nadel in block of polyporus), and is deposited in the ANIC.

Distribution.—This species is known only from the type locality.

Etymology.—The specific epithet, *koongarra*, is the name of the type locality and is a noun in apposition.

Chaetocanace longicauda, new species

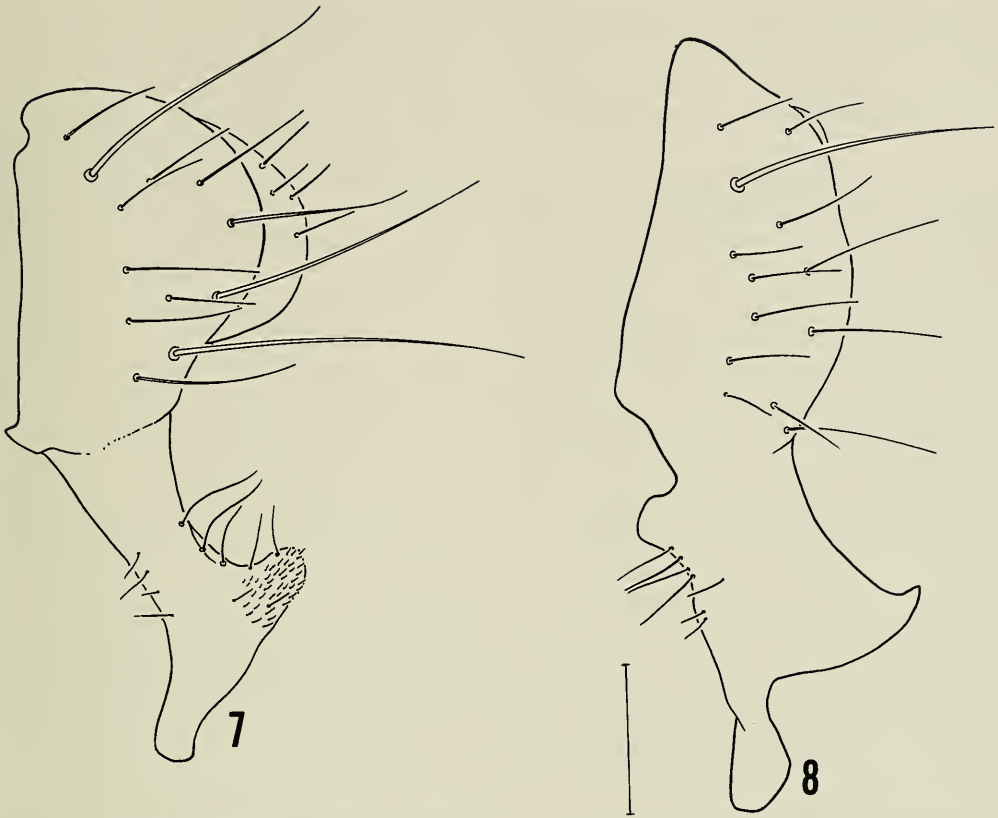
Fig. 8

Diagnosis.—This species is distinguished from *C. brincki* primarily by the shape of the external male terminalia, specifically the surstylus which has the anteroventral process greatly produced, elongate, forming a footlike process; posteroventral process of surstylus distinctly pointed.

Description.—Moderately small beach flies, body length 2.1 to 2.6 mm.

Head: Frons grayish brown, dull. Antenna blackish brown; arista brown. Face and gena densely microtomentose, whitish to faintly bluish white.

Thorax: Mesonotum grayish brown, dull; pleural areas generally whitish gray; anepisternum faintly bluish; katapisternum whitish gray. Acrostichal setulae in 2 rows; anterior supra-alar seta lacking. Wing hyaline; costal vein ratio 0.2; M vein ratio 0.5.



Figs. 7–8. External male terminalia of *Chaetocanace* species: 7, epandrium, cercus, and surstylus of *C. koongarra*, lateral view. 8, epandrium, cercus, and surstylus of *C. longicauda*, lateral view. Scale = 0.1 mm.

Legs with femora mostly gray, midfemora lighter gray; tibiae and tarsi yellow, apical 1–2 tarsomeres brown.

Abdomen: External male terminalia as follows: surstylus in lateral view (Fig. 8) more or less triangular, anteroventral process greatly produced, elongate, shaped like a foot, posteroventral angle distinctly pointed, ventral margin deeply sinuous.

Type material.—The holotype male is labeled “AUSTRALIA: N[orthern]. T[erritories].; S. Alligator River area, 35kmW Jabiru[,] blacklight, 9iv1980 [9 Apr 1980] GFHevel & JAFortin.” The holotype is in fair condition (collected in alcohol, dried, then pointed, dorsum appearing “rubbed”), is double mounted (glued to a paper triangle), and is deposited in the ANIC. Fifteen paratypes (3 ♂, 12 ♀; ANIC, USNM) bear

the same label data as the holotype. Other paratypes are as follows: Australia. Queensland: Cairns, 19 Apr 1957, W. W. Wirth (1 ♂; USNM).

Distribution.—This species is known thus far only from Northern Territory (the type locality) and Queensland, Australia.

Etymology.—The specific epithet, *longicauda*, is a noun in apposition, referring to the long, footlike posteroventral process of the surstylus.

Genus *Dynomiella* Giordani Soika

Dynomiella Giordani Soika, 1956:130.

Type species: *Dynomiella arenicola* Giordani Soika (= *Canace stuckenbergi* Wirth, 1956), by original designation.—Mathis, 1982:9–11 [review]; 1992:5 [world catalog].

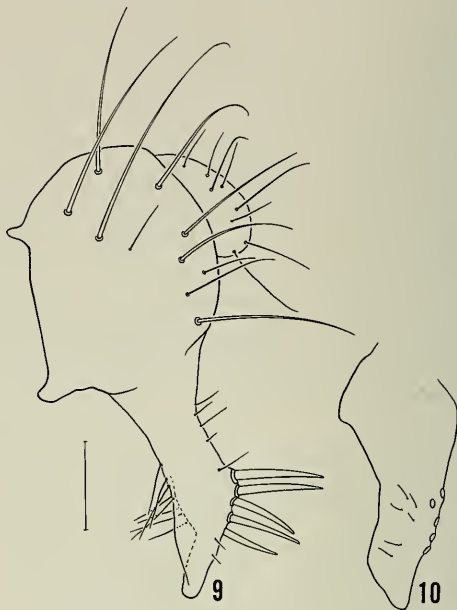
Canace, in part, of authors.—Wirth, 1956: 48–51 [revision, key]; 1960:390 [synonymy of *Dynomiella* with *Canace*].—Cogan, 1980:694 [Afrotropical catalog].

Diagnosis.—Resembling *Canacea* Cresson (Nearctic) but differing from it and other genera by the following combination of characters.

Head: Mesofrons similar to parafrons in vestiture but densely microtomentose, dull, frequently with coloration difference, usually mesofrons darker, brown, with 3–5 large, proclinate setae along lateral margins, midportion of mesofrons bare of setae; postocellar setae subequal to ocellar setae and with similar orientation; 4 large, latero-clinate, fronto-orbital setae; arista short, generally lacking setulae, apical $\frac{1}{3}$ to $\frac{1}{2}$ bare, stylelike; upturned genal setae 2; antero-clinate genal setae 1.

Thorax: Dorsocentral setae 4 (1 + 3), all subequal in size; acrostichal setae conspicuous, in 2–4 regular to irregular rows anteriorly, becoming more regular posteriorly, middle rows with setulae slightly larger and with large pair of prescutellar setae; lateral scutellar setae 2 pairs and with several setae dorsally; supra-alar seta 1, anterior seta usually lacking; 2 notopleural setae; color of pleural setulae variable but usually pale, setae black; postpronotum bare of setulae; 1–2 large, anepisternal setae; katepisternal seta lacking; forefemur armature variable, some species with row of stout, spinelike setae anteroventrally; hindtibia lacking apical seta anteroventrally; apical section of vein M straight.

Abdomen: Female genital lamellae variable, either only moderately broad basally, short, and with lamellar processes over three-fourths total length, each process gradually tapered to apex; or lamellae very broad basally, subtriangular, long, over one-third total length, with each lamellar process narrow, parallel sided; in both cases apex of each lamellar process bearing 1 large, stout, moderately acutely to acutely



Figs. 9–10. External male terminalia of *Dynomiella australica*: 9, epandrium, cercus, and surstylus, lateral view; 10, surstylus, posteroventral view (large stiletlike setae along median margin not included). Scale = 0.1 mm.

pointed seta; surstylus with slight, anteriorly curved process, slightly hooklike.

Dynomiella australica, new species

Figs. 9–10

Diagnosis.—This species is similar to *D. glauca* (South African) but differs in having only 2 rows of acrostichal setulae; the scutellum broadly rounded posteriorly, bearing a single pair of scutellar setae (the apical pair) and sparse setulae on scutellar disc that are more concentrated laterally; and postpronotum bearing 2 large setae. Fore- and midfemora totally lacking prominent black setae along the posteroventral and anteroventral surfaces.

Description.—Moderately small to medium-sized beach flies, length 2.4 to 3.4 mm; generally microtomentose, generally gray but with some whitish gray to brownish gray areas, slightly darker dorsally.

Head: Triangular mesofrons (ocellar triangle or frontal vittae) well developed, usu-

ally more brown to bronze colored than gray to charcoal-gray parafrons, lateral margins straight not curved medially, anterior angle extended to anterior margin of frons, all of median area bare of setae or setulae, mesofrontal seta along lateral margins only; parafrons bearing sparse, randomly inserted setulae, 5–10, none especially well developed. Ocelli forming equilateral triangle.

Thorax: Acrostichal setulae large, in 2 regular rows, sometimes with 1–2 smaller setulae laterad of rows anteriorly; scutellum with posterior margin broadly rounded and short, not triangular; only apical scutellar setae well developed, lacking a basal pair; scutellar disc bearing sparse setulae, 5–7, these more concentrated laterally; postpronotum bearing 2 large setae, dorsal seta almost as large as posterior seta. Setulae of anepisternum and katepisternum fine, pale, pilelike, only 2 large setae toward posterior margin of anepisternum black, prominent. Wing hyaline with faintly brown hues; costal vein ratio 0.24; M vein ratio 0.6. Setae and setulae of legs pale, mostly white but some faintly yellowish white except for ventroapical, spinelike black setae of midtibia; forefemur lacking prominent setae along anteroventral surface; midfemur lacking row of prominent setae along posteroventral surface; tarsi yellow.

Abdomen: Generally gray; setulae on ventral surface of tergites white; tergites 1–2 with setulae on dorsum mostly white; setulae along posterior margin of 3rd tergites black; setulae on dorsum, especially along posterior margin, of tergites 4–7 and epandrium black. External male terminalia as follows: epandrium deeply and widely cleft posterodorsally; surstylus in lateral view (Figs. 8–9) narrow, $3\times$ as long than wide, basal $\frac{2}{3}$ projected directly ventrad from ventral margin of epandrium, thereafter angled anteroventrally, apical $\frac{1}{3}$ much narrower, posterior margin along angle bearing 4–5 well-developed, stiletolike setae; anterior margin with moderately long, fine setulae; surstylus in posteroventral view (Fig. 9) narrow, becoming narrower

toward apex, median margin mostly straight, bearing stiletolike setae, lateral margin sinuous, angulate inward at basal $\frac{1}{3}$, thereafter shallowly incurved to apical $\frac{1}{4}$ which is recurved to apex.

Type material.—The holotype male is labeled “Squeaking Pt. nr Port Sorell, Tas[mania, Australia] 24.xi.1968 [24 Nov 1968] stony beach I. C. Yeo/U.Q.I.C. loan 724 [pale green on dorsum; number handwritten]/HOLOTYPE ♂ *Dynomiella australica* W.N.Mathis [red; gender and species name handwritten].” The holotype is double mounted (smaller pin in a long rectangular block of polyporus), is in good condition, and is deposited in UQIC. The allotype female and 23 other paratypes (11 ♂, 12 ♀; UQIC, USNM) bear the same label data as the holotype.

Distribution.—Australasian: Australia (TAS).

Etymology.—The specific epithet, *austratica*, is an adjective and refers to the continent where this species occurs.

Genus *Isocanace* Mathis

Isocanace Mathis, 1982:11. Type species:

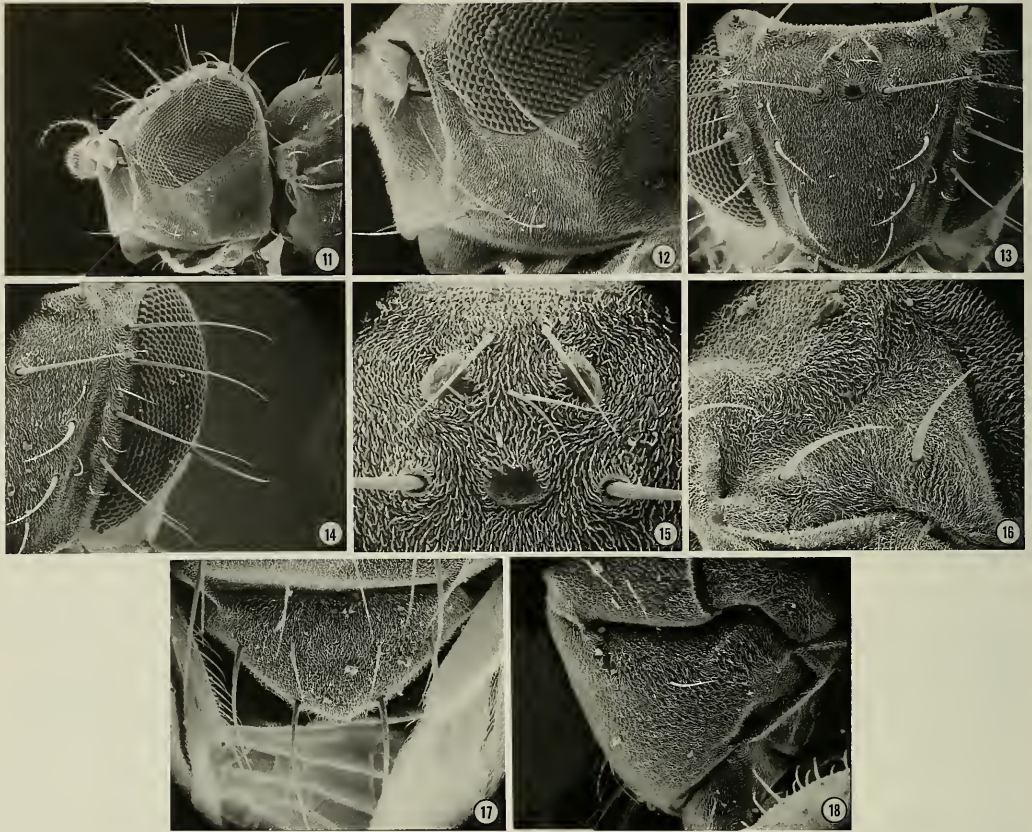
Isocanace briani Mathis, by original designation.—Mathis, 1992:5–6 [world catalog].

Canace, in part, of authors.—Mathis & Wirth, 1979:786.

Diagnosis.—Resembling *Chaetocanace* Hendel but differing from it and other genera by the following combination of characters.

Head: Mesofrons distinct from parafrons, shinier, less microtomentose, with 2–3 large, lateral, generally proclinate setae; postocellar setae smaller than ocellar setae and with more proclinate orientation; 4 pairs of large, latero-clinate, fronto-orbital setae; arista plumose, length of branched rays varying from approximately subequal to nearly twice basal aristal width; upturned genal setae 2–3; antero-clinate genal seta 1.

Thorax: Dorsocentral setae 4 (1 + 3); acrostichal setae evident, in 2 rows but lack-



Figs. 11–18. Scanning electron micrographs of *Isocanace albiceps*: 11, head, lateral view; 12, gena and setae, lateral view; 13, frons, dorsal view; 14, same, left side, dorsal view; 15, ocellar triangle, dorsal view; 16, Notopleuron and setae, lateral view; 17, Scutellum, dorsal view; 18, Katepisternum and setae, lateral view.

ing large pair of prescutellar acrostichal setae; 2 pairs of scutellar setae and frequently with some smaller setae inserted dorsally; with only 1 pair of supra-alar setae; 1–2 notopleural setae, if only 1, anterior seta lacking; color of pleural setae variable, pale yellow to black; postpronotum bare of setulae; katepisternal seta present or absent; 1 large anepisternal seta; hindtibia lacking apical seta anteroventrally; apical section of vein M straight.

Abdomen: Female genital lamellae very broad basally, basilateral margins rounded, narrowed rather abruptly at level of cleft, lamellae very narrow from level of cleft to apices, with only 1 large, stout, acute terminal seta at each apex; surstylus quite

variable, generally slender and with apical curvature.

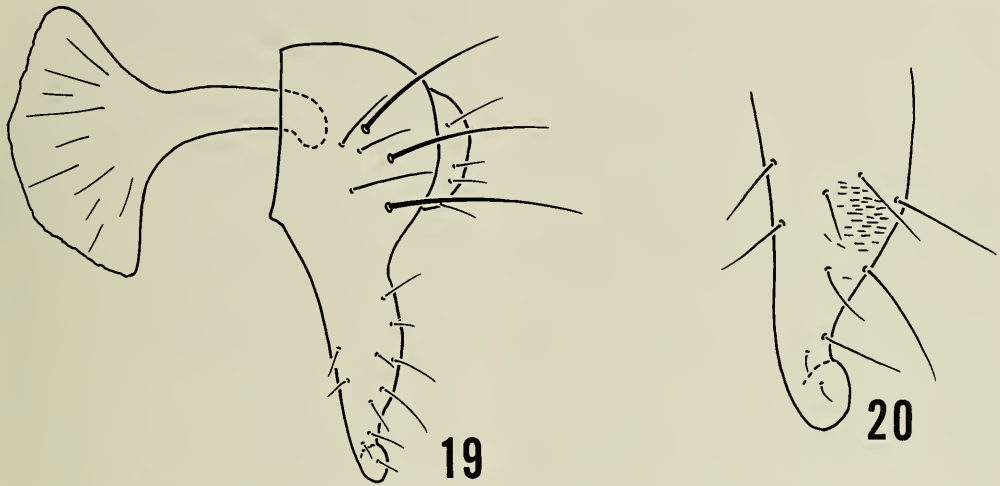
The *albiceps* Group

Diagnosis.—Similar to the *briani* group but differing as follows: Head: mesofrons bare in middle; upturned genal setae 2. Thorax: katepisternal seta lacking; number of acrostichal setae reduced, usually less than 10, and usually paired; anterior notopleural seta subequal to posterior seta.

Isocanace albiceps (Malloch)

Figs. 11–18

Canace albiceps Malloch, 1925:87 [HT ♀ (AM); Australia. New South Wales: Sydney].—Wirth, 1951:262 [review].



Figs. 19–20. External male terminalia of *Isocanace albiceps*: 19, epandrium, cercus, and surstylus, lateral view; 20, surstylus, lateral view. Scale = 0.1 mm.

Isocanace albiceps.—Mathis, 1982:18 [generic combination]; 1989a:670 [Australasian/Oceanian catalog]; 1992:6 [world catalog].—Colless & McAlpine, 1991: 779 [fig. of head].

Australian specimens examined.—New South Wales: Broulee, 17 Sep 1978, Z. Liepa (2 ♂, 3 ♀; ANIC). Careel Bay, 22 Mar–23 Oct 1956, 1962, D. K. McAlpine, W. W. Wirth (35 ♂, 56 ♀; AM, ANIC, USNM). Karuah (inlet, beach), 23 Dec 1968, I. C. Yeo (4 ♂, 9 ♀; UQIC). McCarrs Creek, 20 Sep 1956, W. W. Wirth (2 ♂; USNM). Merimbula (mangrove flat), 12 Feb 1963, D. K. McAlpine (1 ♀; AM). Mona Vale, 11 Nov 1956, W. W. Wirth (1 ♂; USNM). North Cronulla (mangroves), 29 Jan–22 Mar 1962, D. K. McAlpine (4 ♂, 3 ♀; AM). Putty Beach (near Terrigal), 25 Nov 1987, R. Blanche, B. Day, D. K. McAlpine (1 ♂; AM). Queensland: Deception Bay, 23 May 1966, Z. Liepa (1 ♂; ANIC). Tasmania. Squeaking Point, near Port Sorell (stony beach), 24 Nov 1968, I. C. Yeo (1 ♂, 8 ♀; UQIC).

Distribution.—Australasian: Eastern Australia (NSW, QLD, TAS).

Diagnosis.—Specimens of *I. albiceps* are similar to those of the *briani* group but are

distinguished by: mesofrons bare in middle; postocellar seta short and with more proclinate orientation; arista with branching rays long, some nearly double basal aristal width; upcurved genal setae 2; anterior notopleural seta subequal in length to posterior seta; anepisternal setae pale; katepisternum lacking a large seta; surstylus (Figs. 19–20) comparatively wide in lateral view, narrowed subapically, but widened again apically and slightly bulbous, with slight median projected process, posterior margin of surstylus sinuous, anterior margin straight.

Genus *Trichocanace* Wirth

Trichocanace Wirth, 1951:252. Type species: *Trichocanace sinensis* Wirth, by original designation and monotypy; 1964:225–227 [revision; key].—Delfinado & Wirth, 1977:392 [Oriental catalog].—Mathis & Wirth, 1979:795 [diagnosis, discussion].—Mathis, 1982:20–22 [review]; 1992:6 [world catalog].

Diagnosis.—Resembling *Xanthocanace* Hendel and *Chaetocanace* Cresson but differing from them and other genera by the following combination of characters.

Head: Mesofrons and parafrons dull, membranouslike, with fine microtomentose vestiture, distinguished from each other by color and in one species by density of microtomentum, with larger setulae along lateral margins and a few smaller setulae on midportion, but with bare area anterior of median ocellus; postocellar setae subequal to ocellar setae and with same orientation, ocellar setae anterolaterad of ocellar triangle; 4 pairs of large, laterocline, fronto-orbital setae; arista with setulae basally, setulae not longer than arista base, apical one-fourth or less bare, stylelike; upturned genal setae 2, posterior seta directly ventrad of midportion of eye, anterior seta aligned with anterior margin of eye; anterocline genal seta present, although small and pale.

Thorax: Dorsocentral setae 4 (1 + 3), anterior 2 smaller than posterior setae; acrostichal setulae small, pale, in 4–6 rows, lacking large, prescutellar pair of setae; scutellar setae 1 pair, large, with a few smaller, pale setulae dorsally; supra-alar seta 1, anterior seta lacking; anterior-notopleural seta lacking; anepisternal and katepisternal setae pale, numerous, mostly long and thin, pilose; katepisternal seta lacking; hindtibia without conspicuous, stout, apical seta anteroventrally; apical section of vein M rather straight, not arcuate.

Abdomen: Female genital lamellae broad basally, basal $\frac{1}{3}$ to $\frac{1}{2}$ more or less elliptical, with dorsal surface extended, apical $\frac{1}{2}$ to $\frac{2}{3}$ as 2 parallel-sided, narrow processes, each bearing 1 large, apical, acutely pointed, stout seta and several smaller setae; surstylus a simple ventral process from epandrium, variously shaped, but usually with apex slightly to obviously curved anteriorly.

Key to Australian Species of *Trichocanace*

1. Large black species, with heavy gray to pearl-gray microtomentum; dorsum of thorax subshiny; frons dull black laterally, with broad, me-

dian, pearl-gray stripe and gray, microtomentose, posterior margin; both sexes with conspicuous, anteroventral and posteroventral combs, each with 6–10 strong, black spine-like setae on distal half of forefemur

- *T. atra* Wirth
- Dull gray species; frons not black striped; forefemur with only anteroventral comb or combs lacking 2
- 2. Large species, wing length 3.5 mm; forefemur lacking combs
- *T. sinensis* Wirth
- Small species, wing length 2.4 mm; forefemur with inconspicuous, anteroventral comb of 6–8 brownish, slender, sharp spine-like setae on distal half *T. marksae* Wirth

Trichocanace atra Wirth

Fig. 21

Trichocanace atra Wirth, 1964:227 [HT ♂ (USNM, 67135); Australia. Queensland: Cairns; fig. of ♂ terminalia].—Delfinado & Wirth, 1977:392 [Oriental catalog].—Mathis 1982:21 [catalog, key]; 1989a: 670 [Australasian/Oceanian catalog]; 1992:6 [world catalog].

Australian specimens examined.—Northern Territory: Howard Crossing, 12 May 1955, L. D. Crawford (1 ♀; ANIC). Queensland: Bowen (12 mi SE), 6 May 1955, K. R. Norris, Common (1 ♀; ANIC, allotype). Dunwich, North Stradbroke Island, 20–21 Apr 1965, G. Monteith (5 ♀; CNC). Emu Park (NE Rockhampton), 7 May 1970, Z. Liepa (1 ♂; ANIC). Mt. Tozer (11 km ENE, 12°43'S, 143°18'E), 11–16 Jul 1986, D. H. Colless (1 ♂; ANIC). Southport, 6 May 1971, B. H. Kay (1 ♂, 1 ♀; UQIC). Western Australia: Martin's Well (1 km S), West Kimberley, 26 Apr 1977, D. H. Colless (1 ♂; ANIC).

Distribution.—Australasian: Australia (NT, QLD, WA). Oriental: Philippines (Mindanao), Thailand (Cholburi).

Diagnosis.—This is the most distinctive

Trichocanace marksae Wirth

Figs. 22–31

Trichocanace marksae Wirth, 1964:226 [HT ♂ (USNM, 67134); Australia. Queensland: Cairns (bayshore); fig. of ♂ terminalia].—Mathis, 1982:21 [catalog, key]; 1989a:670 [Australasian/Oceanian catalog]; 1992:6 [world catalog].

Australian specimens examined.—Queensland: Cairns (bay shore), 25 Apr–21 Dec 1957, 1976, G. F. Hevel, W. W. Wirth (6 ♂, 22 ♀; ANIC, USNM).

Distribution.—Australasian: Eastern Australia (QLD).

Diagnosis.—This species is the smallest of the genus (wing length 2.5 mm or smaller) and is otherwise distinguished as follows: generally dull gray; frons not striped; and forefemur bearing only anteroventral, comblike row of 6–8 brownish, slender, sharp setae. External male terminalia as follows: Epandrium in lateral view (Fig. 31) with anterior margin shallowly sinuous, posterior margin gently curved, acutely narrowed dorsally; surstylus in lateral view (Fig. 31) narrow, length more than twice width, anterior margin more or less straight, bearing patch of 4–6 moderately long setulae near middle, posterior margin rounded, ventral margin pointed anteroventrally.

Trichocanace sinensis Wirth

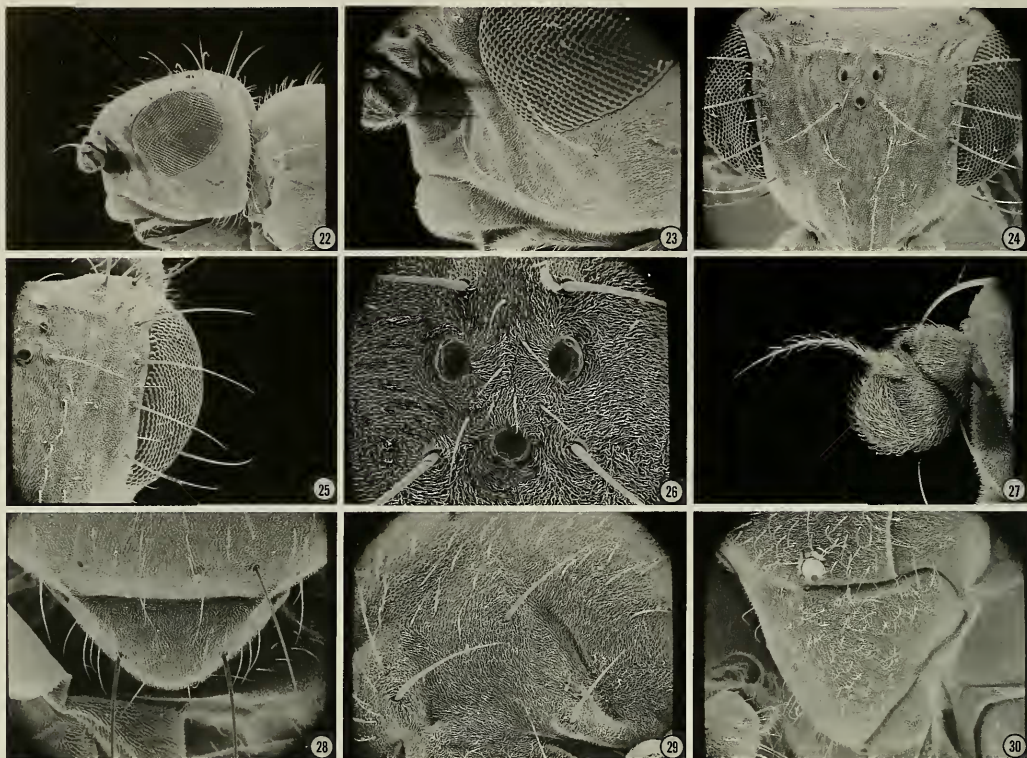
Trichocanace sinensis Wirth, 1951:253 [HT ♂ (BMNH); China. Fukien Province: Foochow (= Minhow); fig. of head, wing, ♂ terminalia]; 1964:225 [review].—Delfinado & Wirth, 1977:392 [Oriental catalog].—Mathis & Wirth, 1979:795 [review].—Mathis, 1982:22 [catalog, key]; 1989a:670 [Australasian/Oceanian catalog]; 1992:6 [world catalog].

Australian specimens examined.—Queensland: Cairns (bay shore), 19 Apr–18–21 Dec 1957, 1976, G. F. Hevel, W. W. Wirth (2 ♂, 2 ♀; ANIC, USNM). Cardwell,



Fig. 21. External male terminalia of *Trichocanace marksae*: 21, epandrium and surstylus, lateral view. Scale = 0.1 mm.

species of the genus and is easily distinguished from congeners by the following characters: large size (wing length 3.3 mm or larger), generally mostly black color with dense gray to pearly gray microtomentum; dorsum of thorax subshiny; frons dull black laterally, with broad, median, pearl-gray stripe and gray, microtomentose, posterior margin; forefemur of both males and females bearing anteroventral and posteroventral comblike rows of 6–10 well-developed setae along distal half.



Figs. 22–30. Scanning electron micrographs of *Trichocanace marksae*: 22, head, lateral view; 23, gena and setae, lateral view; 24, frons, dorsal view; 25, same, left side, dorsal view; 26, ocellar triangle, dorsal view; 27, antenna, lateral view; 28, scutellum, dorsal view; 29, notopleuron and setae, lateral view; 30, katapisternum and setae, lateral view.

8 Dec 1962, K. R. Norris (9 ♂, 5 ♀; ANIC).

Distribution.—Afrotropical: Madagascar (sub-Ouest). Australasian: Eastern Australia (QLD). Oriental: China (Fukien Province), Malaysia (Negri Sembilan), Thailand (Bangkok).

Diagnosis.—This species is large (wing length 3.5 mm), similar to *T. atra*, but differs as follows: generally dull gray; frons not bearing black stripes; and forefemur lacking comblike rows of stout setae.

Genus *Xanthocanace* Hendel

Xanthocanace Hendel, 1914:98. Type species: *Canace ranula* Loew, by original designation.—Malloch, 1924:334 [discussion, generic key].—Cresson, 1936:270 [synonymy, discussion].—Curran,

1934:357 [generic key].—Wirth, 1951:249 [review, key].—Miyagi, 1963:123 [review, key].—Delfinado & Wirth, 1977:393 [Oriental catalog].—Mathis, 1982:22–25 [review]; 1989a:670 [Australasian/Oceanian catalog]; 1992:6–7 [world catalog].

Dinomyia Becker, 1926:107. Type species: *Canace ranula* Loew, by monotypy, preoccupied, Martynov, 1909, and Dyar, 1919.—Cresson, 1936:270 [synonymy with *Xanthocanace*].

Myioblax Enderlein, 1935:235. Type species: *Canace ranula* Loew, by monotypy.—Cresson, 1936:270 [synonymy with *Xanthocanace*].

Diagnosis.—Resembling *Trichocanace* Wirth but differing from it and other genera by the following combination of characters.

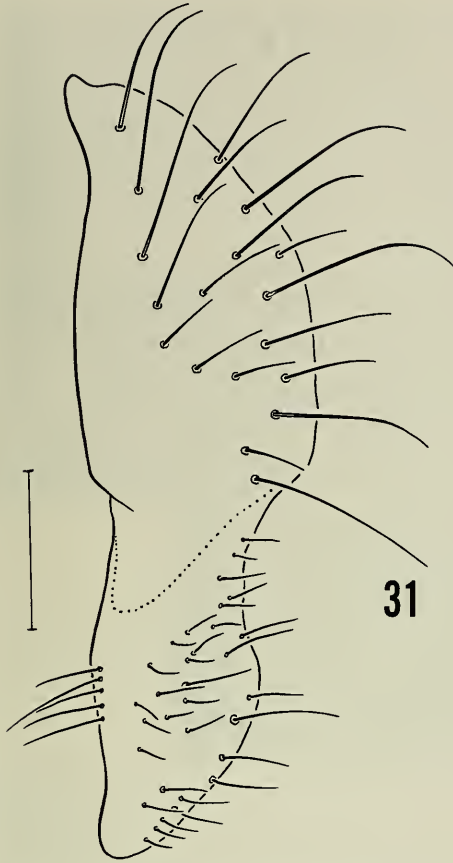


Fig. 31. External male terminalia of *Trichocanace marksae*: 31, epiandrium and surstylus, lateral view. Scale = 0.1 mm.

Head: Mesofrons distinct from parafrons, frequently shiny with metallic reflections, with numerous, uniformly scattered, pale setulae but lacking larger setae along lateral margins, anterior margin extended anteriorly beyond level of antennal bases; post-ocellar setae subequal to ocellar setae, with slightly more divergent orientation; 5–6 pairs of large to moderately sized, pale, latero-clinate, fronto-orbital setae, anterior 1–2 with slight to nearly complete proclinate orientation; arista with apical $\frac{1}{3}$ to $\frac{1}{2}$ bare, lacking branching rays, stylelike; upturned genal setae lacking, antero-clinate genal setae 1–3, inserted along anteroventral margin of gena.

Thorax: Dorsocentral setae variable, usu-

ally only posterior 1–2 setae conspicuously larger than surrounding setae, but some specimens with up to 6 large setae, some presutural, but posterior ones larger; acrostichal setulae in 4 to several rows, these more evident anteriorly, lacking large pair of prescutellar setae; 2 pairs of scutellar setae, pale, numerous dorsal setae; 1–2, supra-alar setae present, anterior one usually lacking; anterior notopleural seta present; anepisternal setulae pale; katepisternal seta lacking; hindtibia without conspicuous, apical seta anteroventrally; apical section of vein M arcuate.

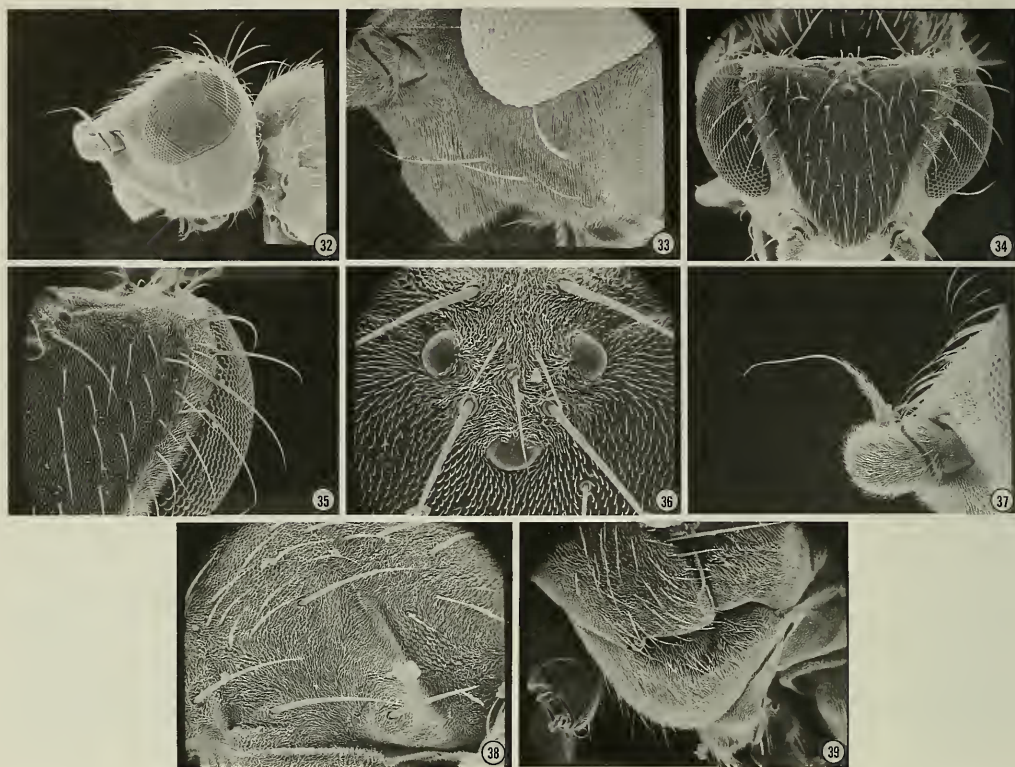
Abdomen: Female genital lamellae moderately wide basally, not narrowed abruptly near level of cleft, bearing only 1 large, stout, acute terminal seta at each apex; surstylus a simple ventral projection from epiandrium, tapered gradually, apex acute to blunt.

Key to Australian species of
Xanthocanace

1. Mesofrons of male thinly microtomentose, somewhat dull, but with some subshiny, metallic luster; mesofrons of female entirely silvery gray microtomentose, dull
 *X. collessi*, new species
- Mesofrons of male mostly shiny, very thinly microtomentose; mesofrons of female mostly dull, microtomentose, with some brownish coloration medially, lateral margins gray *X. nigrifrons* Malloch

Xanthocanace nigrifrons Malloch
Figs. 32–40

Xanthocanace nigrifrons Malloch, 1924: 334 [HT ♂ (AM); Australia. New South Wales: Woy Woy; figs. of head].—Wirth, 1951:250 [review].—Miyagi, 1963:125–126 [distribution, key].—Griffiths, 1972: 256 [discussion of ♂ terminalia].—Mathis, 1982:24 [catalog, key]; 1989a:670



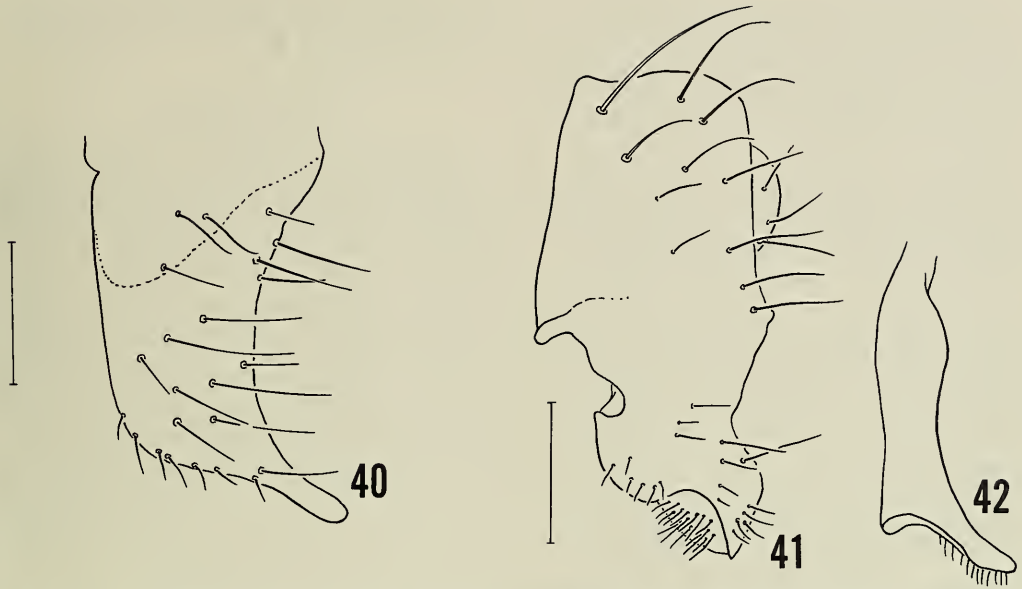
Figs. 32–39. Scanning electron micrographs of *Xanthocanace nigrifrons*: 32, head, lateral view; 33, gena and setae, lateral view; 34, frons, dorsal view; 35, Same, left side, dorsal view; 36, ocellar triangle, dorsal view; 37, antenna, lateral view; 38, notopleuron and setae, lateral view; 39, katepisternum and setae, lateral view.

[Australasian/Oceanian catalog]; 1992:7 [world catalog].

Australian specimens examined.—New South Wales: Angourie, 26 Jan 1980, B. J. Day, D. K. McAlpine (2 ♀; AM). Narrabeen Lagoon (tidal flat), 12 Oct–5 Dec 1956, W. W. Wirth (48 ♂, 49 ♀; ANIC, USNM). Queensland: MacKay Harbour (on sand of beach, high tide mark), MacKay, 25 Jul 1987, R. Jones (1 ♂; UQIC). Miriam Vale District, Eurimbula (sandy pool on beach), 28 Mar 1975, D. K. McAlpine (4 ♂, 12 ♀; AM, USNM). Tasmania: Squeaking Point near Port Sorell (stony beach), 24 Nov 1968, I. C. Yeo (18 ♂, 16 ♀; UQIC). Western Australia: Cape Bertholet (4 km SSE), West Kimberley, 19 Apr 1977, D. H. Colless (1 ♂; ANIC).

Distribution.—Australasian: Australia (NSW, QLD, TAS, WA).

Diagnosis.—This species is distinguished from congeners by the following combination of characters: length over 2.5 mm; mesofrons of male very thinly microtomentose, subshiny, bluish black; mesofrons of female almost entirely microtomentose, dull; mid-femur of male lacking posteroventral comb of 5–10 small, black setae on distal half; femora with at least apical half yellow. External male terminalia as follows: surstylus in lateral view (Fig. 40) bearing short and moderately long setulae, shape narrow, twice as long as wide, basal $\frac{2}{3}$ a gradually narrowing straight process from ventral epandrial margin, thereafter curved abruptly posteroventrally as a much narrower, digitiform process, apex bluntly rounded.



Figs. 40–42. External male terminalia of *Xanthocanace* species: 40, surstylus of *X. nigrifrons*, lateral view; 41, epandrium, cercus, and surstylus of *X. collessi*, lateral view; 42, surstylus of *X. collessi*, posterior view (setae and setulae not included). Scale = 0.1 mm.

Remarks.—I examined a single female as part of this study from Victoria (Mallacoota Inlet, SE Genoa, 4 Aug 1973, Z. Liepa (ANIC)) that is very similar to and may be conspecific with this species. This female is darker in coloration, particularly on the mesonotum, and the mesofrons also has darker hues with slightly more metallic luster shining through the microtomentum. Additional specimens, especially males, will be needed to resolve the status of this population.

Xanthocanace collessi, new species
Figs. 41–42

Diagnosis.—This species is similar to *X. sabroskyi* Mathis & Freidberg and especially *X. zeylanica* Delfinado and is distinguished from either and other congeners by the following combination of characters: Mesofrons of male thinly microtomentose, with some subshiny, metallic luster; mesofrons of female entirely microtomentose silvery gray, dull; femora mostly whitish gray except for yellow apices; tibiae yellow.

Description.—Moderately small to medium-sized beach flies, length 2.2 to 3.3 mm: body mostly silvery white to slightly metallic bluish to whitish gray, darker dorsally with some subshiny areas with metallic luster.

Head: Mesofrons of male thinly microtomentose, somewhat dull, partially subshiny with some metallic gray to silvery gray luster; mesofrons of female entirely silvery gray microtomentose, dull; mesofrontal setulae abundant, conspicuous. Face, gena, and clypeus concolorous, silvery white, densely microtomentose.

Thorax: Mesonotum silvery gray, frequently with some faint bluish coloration, slightly subshiny, with weak metallic luster; pleural areas lighter, becoming almost completely white. Wing faintly milky white; costal vein ratio 0.28; M vein ratio 0.52. Legs: midfemur of male lacking row of 5–10 closely set black setae along apical half of posteroventral surface; femora mostly whitish gray to gray, except for yellow apices; tibiae yellow to whitish yellow.

Abdomen: Dorsum concolorous with mesonotum. Male preabdomen as follows: sternite 3 generally rectangular with rounded corners, slightly narrower anteriorly than posteriorly; sternite 4 nearly as wide as long, anterior margin narrower than posterior margin, posterior margin shallowly and narrowly notched medially; sternite 5 broadly V-shaped with arms angled posteriorly, posterior margin fused with more lightly sclerotized 6th sternite. External male terminalia as follows: epandrium with a deep, narrow, posteromedian cleft dorsally, not bearing long black setae with posterior orientation; surstylus in lateral view (Fig. 41) nearly as wide as long, anteroventral margin rounded, posteroventral margin produced ventrally to a pointed projection, posterior margin shallowly sinuous; surstylus in posterior view (Fig. 42) very narrow, apical $\frac{1}{4}$ as a slender slipper, with apex oriented posteromedially, ventral margin bearing fringe of short setulae.

Type material.—The holotype male is labeled “[AUSTRALIA] 5 km SSW of Cape Bertholet WA West Kimberley 21 Apr 1977 D. H. Colless/At light/HOLOTYPE ♂ *Xanthocanace collessi* W. N. Mathis [red; gender and species name handwritten].” The holotype is double mounted (smaller pin in a block of polyporus), is in good condition, and is deposited in ANIC. The female allotype and three other paratypes (♀; ANIC) bear the same label data as the holotype. Other paratypes are as follows: Western Australia: Cape Bertholet (8 km S), West Kimberley, 17 Apr 1977, D. H. Colless (2 ♂, 28 ♀; ANIC, USNM). Cape Bertholet (3 km S), West Kimberley, 20 Apr 1977, D. H. Colless (2 ♀; ANIC). Cape Bertholet (4 km SSW), West Kimberley, 18 Apr 1977, D. H. Colless (2 ♀; ANIC).

Distribution.—Australasian: Australia (WA).

Etymology.—The specific epithet, *collessi*, is a genitive patronym to recognize the many contributions of Donald H. Colless to the study of Diptera, the Australian fauna

in particular. He also collected all specimens of the type series.

New Genus

Diagnosis.—Resembling *Trichocanace* Hendel and *Chaetocanace* Cresson but differing from them and other genera by the following combination of characters.

Head: Mesofrons and parafrons dull, membranelike, with dense microtomentose vestiture, distinguished from each other by color and density of microtomentum, with larger setulae along lateral margins and a few smaller setulae on midportion, but with bare area anterior of median ocellus; post-ocellar setae subequal to ocellar setae and with same orientation, ocellar setae inserted anterolaterad of ocellar triangle; 3 large, latero-clinate, fronto-orbital setae; arista with basal segment bare, apical segments bearing tiny hairs; genal setae 3, antero-clinate and slightly upturned apically, aligned horizontally.

Thorax: Dorsocentral setae 6 (2 + 4), anterior seta smaller than posterior setae, 5th seta inserted slightly mediad to alignment of anterior setae, posterior seta inserted slightly lateral of alignment; acrostichal setulae lacking anteriorly but with a prescutellar pair of setae; lateral scutellar setae 2; scutellar disc with a few setulae, 3–5; supra-alar setae 1 large and 1–2 smaller setae anteriorly; notopleural setae 2, both well developed; anepisternum with 2 larger setae along posterior margin, 2–3 smaller setae below and a few setulae medially; katepisternal seta lacking. Apical section of vein M rather straight, very shallowly sinuous, not arcuate. Hindtibia without a conspicuous, stout, apical seta anteroventrally.

Abdomen: Female genital lamellae reduced and lacking prominent setae apically and subapically.

New Species of New Genus

Australian specimens examined.—South Australia: Coward Springs (5 km NW),

near Lake Eyre, 22 Sep 1972, Z. Liepa (1 ♀; ANIC).

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